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SURVEY OF SOVIET HEAVY INDUSTRY (2)

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FOREWORD

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SURVEY OF SOVIET HEAVY INDUSTRY (2)

This is a series report, published approximately biweekly, which contains items of interest on Soviet heavy industry as reflected in articles, short news items, announcements, etc., appearing in various USSR publications. The items contained in this report fall under the broad categories listed below in the table of contents.

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MACHINE TOOLS

New Automatic Exhaust Manifold Line

"It is a matter of honor for the workers of the machine tool plant to build 220 automatic assembly lines during the Seven-year Plan." This task was placed before the glorious collective of the Machine Tool Plant imeni Ordzhenikidze. How much human labor they will save, how much higher production these 220 complex units will give, where every part and every assembly will be made without a single worker's hand!

"But it is clear now that this figure will not be our 'ceiling'." Factory Party Committee Secretary Valentin Ivanovich Romanin said, smiling. "Our collective has so much energy and initiative that nobody doubts that we will over-fulfil the Seven-year Plan."

Yes, the Party Committee Secretary is right! Go to the plant and look at the results of competition, the great labor competition in honor of the July Plenum of the Central Committee of the CPSU. Look at these figures in the shape of completed automatic assembly lines in the light-flooded

New Automatic Exhaust Manifold Line (cont'd)

expanses of the assembly shop. "Here is the completed 1L87 Line," said Foreman Ivanov as he led us to the unit which spread out through part of the shop. "Soon the purchaser, the Automobile Plant imeni Likhachev, will take delivery."

Controller Vladimir Pyatakov shows us the line's technical passport. If we said simply that it produces automobile exhaust manifolds, the vast majority of readers would not be able to imagine the scope of an automatic production line's operations. We shall name them. After the part falls onto the conveyor, three different operations take place; milling, reaming of the aperture, and boring of six holes. All this takes place in about one minute! Consider that the line works on two parts at once and you will see how astronomically the speed of the line exceeds that of human labor! But the 1L87 is already old hat. Right now the contours of new, more powerful and modern automatic lines are rising in the assembly shop. The competition for ahead-of-schedule fulfillment of the Seven-year Plan is continuing. (Vechernyaya Moskva, 13 July 1960. Partial translation).

New Machine Tool

The SKB-8 x design collective under the leadership of Chief Designer Yu. N. Tatarov, has created a new complex machine tool which can be adjusted to machine several different parts. The new tool is equipped with 16 power heads and can do 16 different operations at once; cutting, milling, drilling, etc.

The centra-columned machine tool has been designed according to all the latest scientific and technological advances. It works on an automatic cycle. The auxiliary operation time has been decreased considerably due to the high-speed modification for clamping parts. The observation-control mechanism is very interesting.

The control apparatus for all instruments working on the tool are placed on a special stand. A worker, establishing by chart that a given milling cutter can work 450 parts before becoming dull, sets the instrument at this figure. As soon as the tool works 450 parts, a signal lights up on the instrument: time to replace the milling cutter!

New Machine Tool (cont'd)

If the worker does not replace it or does not want to respond to the signal, the master-control switches off the machine tool. If the instrument goes out of commission, breaks down, etc., the tool also stops on an order from the observation-control mechanism. There is an analogous mechanism for controlling all phases of the tool: heads, table, etc. The collective of the automatic production line plant has produced the first tool of this new design in a remarkably short time. The machine is now on exhibit at the Exhibition of the Achievements of National Economy. (Sovetskaya Belorussiya, 13 July 1960. Full translation.)

Automatic Rotary Machine Tool Lines

In scientific and designers' circles lately, the chief topic of conversation has been L. N. Koshkin's new invention, the automatic rotary lines, where the parts are worked during transfer. The new machines' chief advantage is their high productivity (up to 120-240 parts a minute), independent of the length of any of the single operations. In connection with this, it is practical to assume that the design and production costs will pay for themselves within two to three years.

Rotary lines are best used in those industrial operations where the level of technological development is rather high: pressing, casting, sheet-steel stamping, plastics pressing, etching, impregnation, drying, chemical plating and galvanizing, tempering, and annealing. In short, we mean those processes which are characterized by surface and volumetrical treatment of the machine on the object being treated. These processes are well-known and dispersed throughout many branches of industry: plastics, glass, ceramics, porcelain, stamping.

Automatic Rotary Machine Tool Lines (cont'd)

Even not assuming that rotary lines can be used also for processes of a lower type, such as milling, drawing, polishing, and drilling, which are characterized by a continuous and flowing action of the tool on the part being machined, the necessity and possibility of incorporating new machines in industry more widely is obvious.

What is hindering this? Some believe that it is due to insufficient production and small yearly production plan of certain parts. In such a case, the high productivity of the rotary machines is considered to be their chief drawback. Is this not absurd? High productivity is a necessary condition for any automatic line; otherwise, it would not pay. Of course, the line must run at full capacity. Would it pay to build super-highways if the traffic were to be very small? The analogy here is almost perfect.

What happens when a particular part is needed only in very small quantities? There is a solution. Let us assume that the yearly output of some particular parts at one plant is not large enough to keep a rotary line running at capacity, but that other plants also produce these

Automatic Rotary Machine Tool Lines (cont'd)

parts. One of these plants should specialize, concentrating the entire output of these parts at this plant, for which a rotary line would be built. The solution, consequently, is specialization and cooperation.

For example, in Noginsk, Khar'kov, Barnaul, Kursk, and Vladimir, identical copper-fibre gaskets are produced. The Central Planning-design and Technological Bureau of the Moskovskaya Oblast' Economic Council has designed a rotary gasket line for the Noginsk Fuel Equipment Plant, which is being built at the Klin Machine Tool Plant. The line will allow the production of these parts to be concentrated at Noginsk.

Such a solution, of course, is not always possible. Sometimes cooperation still does not provide the necessary yearly production program. Does it pay in such cases to set up rotary lines? Of course. But first it is necessary to make a parts classification and design multi-category rotary lines for a certain part of them on the principles proposed by L. N. Koshkin.

Automatic Rotary Machine Tool Lines (cont'd)

In all machines and tools, regardless of their purpose, there are certain similar parts: sheet steel, plastic, porcelain, and others. They can be collected into groups and then divided into dimensional categories. The construction of multi-category rotary lines for parts of definite dimensional categories is entirely possible. As for special parts whose total two-year production would not pay back the investment made, it would of course be better to apply some other means of production.

The construction of a series of multi-category rotary lines of one definite type or other will mean automation in the production not of separate parts or even groups of parts, but of a definite branch of industry: plastics, porcelain, ceramics, or glass. It is therefore clear that insufficient quantity of production will in no way hinder the broad application of rotary machine tool lines. The slow pace of furnishing our industry with this equipment is explained by the shortage of designers and lack of co-ordination among them.

Automatic Rotary Machine Tool Lines (cont'd)

The interest in rotary automatic production lines is very great. In many plants in many cities small, feeble design departments and groups, consisting of four to six persons, are being organized. But lacking experience and methods of designing rotary lines, and even the norms and classed solutions for the various operations, which have been worked out in L. N. Koshkin's office, they are working with neither sail nor rudder.

For the designing of rotary lines, it is time to set up powerful planning organizations at the economic councils, whose work would be co-ordinated through the State Automation and Machine Tool Construction Committee of the USSR Council of Ministers. It is also essential to specialize these design bureaus according to various types of production, considering the specific needs of a given economic rayon.

The plan documentation of the series of lines created by each bureau for a specific type of production, after inspection and correction during actual conditions of production, can be transmitted as master plans to all planning

Automatic Rotary Machine Tool Lines (cont'd)

bureaus and plants. The most important item is the organization of a master institute for planning and design of rotary lines. This has been discussed for a long time, but nothing concrete has been done.

Many difficulties are caused by a lack of technical literature on rotary lines and a great shortage of qualified personnel. Young machine tool builders are neither acquainted with the classification of technological processes and machinery which was worked out by L. N. Koshkin nor with the construction of rotary lines. Only the Tula Institute of Mechanics is training this type of specialist. And 40 - 45 such specialists are needed just in the Central Planning-design and Technological Bureau of the Moskovskaya Oblast' Economic Council to carry out the schematic plan for 1961.

There are few books and pamphlets on rotary lines, and these are printed in small quantities and bought up immediately. But it is insufficient knowledge of the new machines which causes some specialists to doubt their effectiveness. The new system also has its opponents of

Automatic Rotary Machine Tool Lines (cont'd)

another kind. At the July Plenum of the Central Committee of the CPSU, N. S. Khrushchev said: "Some bureaucrats are accustomed to the old nag and don't want to change to a real race-horse, for fear he might not make the turn and knock them out of the sleigh! Because of this, some people will hold on to the old plug's tail for dear life."

But all these difficulties are of a temporary nature. They can slow down but not stop the implementation of rotary lines in our industry. The important thing is not to under-estimate them, because in such a case the re-tooling in many branches of economy will drag on for years. This means that the chance to make great savings will be lost. Let us take as an example the effectiveness of the rotary lines planned by the Central Planning-design and Technological Bureau. 26 lines will be programmed here by 1962. A technical-savings calculation has been made for only seven of them. It shows that they will save 1,618,000 rubles a year. Expenses in designing and constructing the lines will be amortized within a year and

Automatic Rotary Machine Tool Lines (cont'd)

a half. Rotary automatic machine tool lines are an eminent achievement of the Soviet designers. They should find worthy application in our national economy. (Ekonomicheskaya Gazeta, 3 July 1960. Full translation).

Automatic Rotary Machine Tool Lines

What does a person feel who is standing at the forefront of the battle for technological progress? Above all, he feels a tremendous responsibility for the situation. He sees many difficulties in his path, but the consciousness of the importance of his work forces him to forge ahead toward the cherished goal.

We, the designers of rotary automatic production lines, have these feelings right now. A deep conviction that the rotary line is, in principle, the last word in technology, that the future belongs to it, compels us to move forward toward the problems connected with the designing and construction with great seriousness. It is this that has compelled me to take pen in hand.

That morning it was unusually noisy in the office of G. F. Alekhin, head of the Automation Division of the Central Planning-design and Technological Bureau of the Podolsk Plant imeni Kalinin. The technique of constructing the pressure shaft socket on the rotary automatic line for the Kolomna "Tekstil'mash" Plant was being dis-

Automatic Rotary Machine Tool Lines (cont'd)

cussed. The argument was heated and on fundamentals. This was not surprising, for it joined old "opponents", the designers and technologists.

The technological section of the bureau, headed by V. Z. Kiselev, was proposing a new technological process which differed basically from the one being used in the plant. The designers, led by the project's chief engineer, Yu. A. Tsvetkov, insisted on the plant's old process. They said it was better to have a bird in the hand than two in the bush.

Who knows how it would have come out if representatives of L. N. Koshkin's design bureau, the originators of the rotary automatic production lines, had not been present at the discussion? "Planning a rotary line according to untested technological principles", they explained, "is the same as solving a problem with two unknowns in one equation. In case the line doesn't work or gives a high percent of faulty production, nobody will be able to say where the error lies, in the principle or in the actual construction of the line. On the other hand, it is also

Automatic Rotary Machine Tool Lines (cont'd)

wrong to take the plant technological variant as a basis with no attempt to find a better one."

A solution worthy of Solomon was arrived at: to draw up plans for the line according to new technology and at the same time to get together with the purchasing plant, test it experimentally, and in the event of success to continue the plans according to the new principles. In case of failure the old system would be used.

Arriving on the 28th of March of this year, the representative of the Kolomna "Tekstil'mash" Plant, A. Klovov, learning how things were, wrote on the technological operations card: "Confirm the principle with experimental testing of operations from one to five ---" In a few days our division's technical engineer, V. Sapozhnikov, sent to the Kolomna plant the matrix and punch blueprints, which were necessary for the experiment. In the meantime, Comrade Klovov had gone on his vacation, and the blueprints lay around on the desk of the plant's chief technician, Comrade Stepanov.

Automatic Rotary Machine Tool Lines (cont'd)

Meanwhile our work was going full steam ahead. April passed and May was here. They proceeded from tentative plans to the actual plans, from the general solution of basic problems to the specific problems of the line's assembly points and intervals. What were the results of the technological tests? This question worried the technologists as well as the designers. Since the plant was silent, in the middle of May we were forced to send our representative to Kolomna. He returned with the sad news that nothing had been done at all. This was practically a catastrophe. We were forced immediately to roll up the new plans and return to the old and tested variant. What a waste of valuable time this was! Not having tested the new, more progressive method, we returned to the backward one of our grandfathers and had to adapt to it the most modern technological advances! This situation is intolerable.

Not long ago we designed a rotary line for the production of copper-fibre gaskets for fuel pumps for the Noginsk Fuel Equipment Plant and the rotary line project

Automatic Rotary Machine Tool Lines (cont'd)

for the Kolomna "Tekstil'mash" Plant. A line for the Podol'sk Battery Plant is also being designed. And great plans are being made for the future! Is this accidental? Of course not. Rotary lines are revolutionizing many branches of mass production. Judge for yourselves: just one multi-category line for the production of battery lids will free 20 100-ton presses, 20 TV4 generators, 15 machine tool units and 355 square metres of productive space! About 200 workers will be freed for other duties. These are eloquent figures! But many people have not yet grasped them. Otherwise we would have been freed long ago from obstacles which are blocking us from moving forward on a wide front. No sooner do we get over one worry, then another one arises. We should have at least 150 designers in our department in order to handle the load. We need about 600 square metres of productive area to accommodate them. Right now we have only 25 designers. They are squeezed into 75 square metres. Another problem is that the line is being planned in Podol'sk, the exper-

Automatic Rotary Machine Tool Lines (cont'd)

imental base (still without the necessary equipment, by the way) in Naro-Fominsk, and the production plant in Klin. This is how the Economic Council set it up. Is this an intelligent way to do it?

Now even the planning is being split up. Podol'sk, Moscow (in the Central Planning-design and Technical Bureau itself), and Klin have their own rotary line designers. Besides that, other economic councils are doing the same job. The scattering of forces is leading to duplication and complicating the solution of the problems dealing with the typification and unification of rotary lines.

L. N. Koshkin's design bureau's ten-year experience in planning rotary lines has been disseminated very poorly. The only book on this subject has been printed in extremely small quantities.

In conclusion, it is imperative to create, with L. N. Koshkin's design bureau as a base, a planning institute with an experimental base and a plant equipped to produce rotary production lines. The problem of furnish-

Automatic Rotary Machine Tool Lines (cont'd)

ing industry with the technology of the future -- rotary automatic production lines -- must be solved more boldly, by means of a united front. (Leninskoye Znamya, 12 July 1960. Full translation).

Rotary Machine Tool Lines

In spite of perfections in the processes of pressing and casting, cutting remains the primary method of giving machine parts their final form, accurate dimensions and the required surface characteristics. A considerable increase in the productivity of labor of cold-working metals can be achieved by raising the cutting intensity rate with maximum continuity in the process, as well as an increase in the number of simultaneous operations and parts being worked at one time. How is this to be achieved?

First of all, it is imperative to a multi-positional mechanism for all sequence operations and automatic lines to be composed of special or universal machine tools. Increasing the level of machine automation to a considerable degree is aided by equipment specialization. But under conditions of rapid technological advance, where products often change, and in connection with this the need for tool modification arises, it has become more advantageous to include tools of increased universality into

Rotary Machine Tool Lines (cont'd)

automatic processes. Because it is impossible to effect a rapid modification in automatic tool processes, such processes have not been used much in mass-production. Now they are "catching on" in this area.

Parts put out by factories with mass-production methods can be divided into classes and groups. This allows us to classify technological processes and define multi-purpose types of machine tools, which are necessary for these processes. Thus, it is possible to construct standard loading, transporting, storing and other means of automation.

ENIMS (Eksperimental'nyy Nauchnyy Institut Mashinostroyeniya -- Experimental Scientific Machine-construction Institute) is busy solving these problems. In the institute and in the experimental plant "Machine Tool Construction", a whole series of semi-automatic machine tools has been built, from which typed automatic lines have been set up to machine particularly common parts. Their effectiveness is now being tested. Such lines are

Rotary Machine Tool Lines (cont'd)

being successfully used for mass-production at machine tool plants in Moscow, Khar'kov, Baku, Tallin, Tomsk, and Mednogorsk. The Byelorussian Economic Council has been forwarded the blueprints of several machine tools to be put into production.

The country's plants and planning organizations, using our technical documentation, are building automatic lines. Lines for producing turbine augur parts, flanges, disks and cogged wheels are being set up in Minsk. Many plants have planned and produced with their own resources automatic lines from existing equipment according to our methods. A shaft-machining line has been set up at the Ul'yanovsk Automobile Plant. The Moscow Automobile Plant imeni Likhachev is working on a line for the production of flanges, using one of the typed transport systems and line components worked out by ENIMS.

In our opinion, this is the correct method of solving the problems of complex automation. As is well-known, one of the methods for increasing productivity is the simultaneous machining of several parts on one machine

Rotary Machine Tool Lines (cont'd)

tool. As a rule, this method is advisable only in the case of particularly large-scale production of parts of small dimensions, on rotary type machine tools. Although the term "rotary" as applied to machine tools is of rather recent vintage, the basic idea is not only an old and well-known one, it has been used for over 30 years. Rotary machine tools, however, were not in general use both here and abroad. In the United States and England they have received the incorrect designation of "continuous".

On rotary tools, as on machine tools of the conventional type, the movement of the tool has an interrupted character. Only the circular motion of the rotor, on which several parts and the instrument are located simultaneously, is continuous. Thus, completing its trip around the axis of the rotor, the part is machined and is replaced by a new part in the original position.

For some time the press has devoted much attention to rotary automatic lines, which are a system of machine tools connected by rotary transport mechanisms. They

Rotary Machine Tool Lines (cont'd)

are given qualities they do not possess. They are called "the high road" to industrial automation. This, however, is not accurate. Considering the many different characteristics and conditions of production, it is impossible to find one solution which is technologically and economically feasible for all cases. We shall give an example. The continuous and highly-productive process of part finishing is a centerless, moving polishing process. However, the application area of this process is governed by the shape of the parts to be polished. There are many such examples. Therefore the choice of process and equipment should take place in such a concrete case separately and by means of comparison.

Any tool used for parallel machining of several parts, including the rotary type, should be used only in conditions of particularly mass-production. But mass-production comprises only one-fifth of all machine construction. This alone shows that in machine construction rotary grouping cannot be called the "high road" of complex automation of industry. However, mechanical engineer

Rotary Machine Tool Lines (cont'd)

L. N. Koshkin, assuming that the time has come to create a special rotary line organization, tries to present the cases in this manner in his speeches and articles.

A special session of the scientific-technical council of ENIMS was devoted to a discussion of the peculiarities of the rotary grouping applicable to automatic metal-cutting tools and lines. Many specialists took part in the work of the council. The council came to the conclusion that the attempts of L. N. Koshkin and his assistants to see any rotary tools and lines as a "higher" class of machinery, bestowed with unique qualities to be unfounded, since these properties, in the majority of cases, can be generalized for machines of a rotary or non-rotary type. Actually, rotary machine tools and lines have many technical peculiarities and drawbacks which sharply limit the range of their use in machine construction. Thus, the "higher" qualities ascribed to rotary tools and lines, which supposedly make them applicable in any situation, are imagined. The creation

Rotary Machine Tool Lines (cont'd)

of special organizations specializing in planning machines and lines of just the rotary type would not contribute to a more economical solution of the problem. (Izvestiya, 14 September 1960. Full translation.)

VEHICLES

New Busses

A few days ago, 10 busses of a new make -- "Turist" -- went out through the gates of the L'vov Bus Plant. They were shipped to Moscow. The plant collective is building even more improved models. The "Karpaty" bus, with a powerful 160 hp motor, hydra-mechanical transmission, pneumatic suspension and other features designed to improve the operation of the bus and insure the comfort of the passengers, is now undergoing factory testing. The "Karpaty" will be used for inter-city transportation. (Pravda Ukrainy, 3 August 1960. Full translation.)

New Truck

The test model of a new Georgian truck, "KAZ-605", has been built in the experimental shop of the Kutaisi Automobile Plant. Unlike trucks being produced at present, it has no springs. They are replaced by a system of pneumatic suspension, a round pneumatic rubber balloon with three sections.

The pneumatic suspension lessens the jolts caused by uneven roads and extends the life of the truck. Its use also economizes on the use of many expensive metals. Starting next year, the plant will start mass-production of trucks with pneumatic suspension systems. (Vechernyaya Moskva, 3 August 1960. Full translation).

New Trucks

In one of the display areas of the Exhibition of the Achievements of National Economy, where the achievements of the Soviet automobile industry are demonstrated, the attention of visitors is attracted by new trucks from the Minsk, Moscow, and Kutaisi Automobile Plants. A four-ton truck, "ZIL-130", was produced by the Moscow Automobile Plant imeni Likhachev. It has a new, 138 hp V-8 engine. (Turkmenskaya Iskra, Ashkhabad, 4 August 1960. Full translation).

New Tractors

A plan for a tractor with an electric power plant, for use in large underground mining operations, has been created by the designers of the Chelyabinsk Tractor Plant. The construction of test models has begun in the plant's shops. The electric tractor is designed for the mines of Dzhezkazgan (Kazakhstan), where copper mining is done in large subterranean galleries.

The designers of the Chelyabinsk Plant imeni Kolyushchenko, in collaboration with the personnel of the Kazakh SSR Academy of Sciences Mining Institute, have designed a bulldozer with hydraulic drive for cleaning out the subterranean mining excavations. It has a rotating dump, which can be operated from the operator's seat. This makes the machine maneuverable in the cutting-face.

The electric tractors can be used not only for subterranean excavation equipment. Besides a bulldozer blade, they can be fitted with a scoop or road-grading blade and used in construction work, lumbering, and many other branches of the national economy. (Sovetskaya Moldaviya, Kuybyshev, 3 August 1960. Full translation).

MISCELLANEOUS EQUIPMENT

New Electrical Equipment

At the Electrical Machine Construction Plant imeni V. I. Lenin, mass-production of a perfected type of diesel unit has started. The new model has many improvements over The old one. The plant's design engineers, under the leadership of G. Markaryan, are responsible for its modernization.

The electrical machine builders have also started production of a 100 kilowatt-ampere complex substation. This substation is more compact than the old model. According to estimates, almost a million rubles a year will be saved by this.

Models of a size twelve generator are now being assembled. The new generator is the largest and most powerful machine to be produced in the plant. This year the plant collective should put out about 20 types of new equipment. In the past six months, mass-production of eight of them has gotten underway. (Kommunist, Yerevan, 4 August 1960. Full translation).

New Crane Construction Methods

At the Kama and Bratsk hydro-electric stations and in the steel mills of Siberia and the Far East, overhead and gantry cranes built by the collective of the Lenin-grad Hoist-Transport Equipment Plant imeni S. M. Kirov are operating. What is a good crane? Beauty of open-work construction? Of course, this also. But the most important factor is its technical perfection, long life and economical operation. In preparation for the Plenum of the Central Committee of the CPSU, the plant decided to produce 1,200 tons of cranes a month. Formerly they produced only 1000 tons of hoist mechanisms a month. The difference is small, but the growth in production is accompanied by a decrease in the weight of the individual cranes, and this is extremely important. Here are a few examples. A five-ton gantry crane was lightened 40 tons, a ten-ton crane -- 27 tons, and a 15-ton -- 25 tons. A one-ton weight decrease saves up to three thousand rubles.

Whoever has climbed into the cabin of an old overhead crane is amazed by the bevy of various mechanisms, handles, and levers. Now things are much simpler. The

New Crane Construction Methods (cont'd)

crane operator's job is much easier, and his labor productivity has increased. "However, we could make cranes even better," says the Assistant Chief Designer, Grigoriy Yefimovich Sushanskiy. "The basic element of a crane is its motor. We have gone over to flange motors. They are wonderful, but the plants are sending us very few of them. Take reduction gears. The Leningrad Plant imeni Kotlyakov and the "Reduction Gear" Plant are putting out stuff that has not changed since 1953. Can seven-year-old equipment stand the elementary technical test of our time? Their power is one third of that which we need.

The cable problem is no less important. Mounted on metal girders, it must have a reliable shield, but we do not receive such armored cables. We must get along with the ordinary ones. We thread them through pipes -- that is their entire protection. But how much pipe is expended incorrectly in this way?

In the third section of the metal construction shop, I observed how electric-welder Volkov used a technological

New Crane Construction Methods (cont'd)

innovation, automatic welding of crane drums. Up to now this difficult and lengthy operation was done by hand. Implementing the TS-17 stand has improved seam quality and has doubled labor productivity.

Automatic welding of corner seams is also being used. This is a very complicated process. Specialists from Sverdlovsk, Kuybyshev, and the Ukraine have good reason to come and learn from the Kirov workers, who reconstructed the automatic ADS-1000. As a result of this, defective work was decreased 16 percent.

"Soon we'll have it down to zero", says master Anatoliy Moyseyev. "We have just re-adjusted the automatic units." As one more step toward automation, a defectoscope with radioactive cobalt has been put into use in the plant. Every seam is inspected with this sensitive instrument.

The light cranes which were born in this shop's welding flame will serve for a long time. Many other technological innovations are also used here to transform an unwieldy angle bar into a finished piece and to join

New Crane Construction Methods (cont'd)

separate parts into a gigantic beautiful mechanism by means of presses, autogenesis and electrode. A crane for the copper mines of Kazakhstan is being constructed at this plant. The mighty machines will be able to lift up to 60 tons. They are essential to the miners of Dzhezkazgan. By means of these cranes, mighty power shovels can be lowered into the underground galleries up to 20 metres in depth, as can ore-cars, bulldozers, and dump-trucks. (Ekonomicheskaya Gazeta, 3 August 1960. Full translation).

New Grain Loader

The Novo-cherkassk Mechanical Plant started production on moving hydraulic automatic loaders, "PGAR". They will be used for unloading grain from side trucks. (Sovetskaya Kirgiziya, Frunze, 4 August 1960. Full translation).

New Ventilators

The T'llin Machine Construction Plant "Teras" is producing ventilators for increasing the draught in smoke stacks (with water-cooled bearings). The demand for this item is growing daily. It has become clear that the production of these ventilators must be mechanized and partially automated. The shop foreman, young engineer Kh. Eensalu, has gone to one of the Moscow area's largest plants to become acquainted with the organization of mechanized ventilator production. (Sovetskaya Estoniya, 3 August 1960. Full translation.)